REMARKS

SUMMARY:

The present application sets forth original claims 1-20, of which claims 1 and 12 are independent claims.

Original claims 3-5 and 8-11 stand rejected under 35 U.S.C §102(b) as being allegedly anticipated by U.S. Patent Nos. 4,811,162 (Maher et al.) or 6,232,144 (McLoughlin). Original claims 1-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,310,757 (Tuzuki et al.) in view of U.S. Patent No. 3,992,761 (McElroy et al.). Claims 2, 6, 7 and 12-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Maher et al. or McLoughlin in combination with Tuzuki et al.

Responses to the rejections summarized above (including traversal of the prior art rejections) are hereafter presented with respect to each individual argument presented by the Examiner.

REJECTION OF ORIGINAL CLAIMS 3-5 AND 8-10 (35 U.S.C. §102(B)):

Original claims 3-5 and 8-11 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Nos. 4,811,162 (Maher et al.) or 6,232,144 (McLoughlin). By rejecting original claims 3-5 and 8-11 under 35 U.S.C. §102(b), an assertion is made by the Examiner that the Maher et al. and McLoughlin references disclose all the features of independent claim 1, from which claims 3-5 and 8-11 variously depend.

Claim 1 sets forth a method of forming electrolessly plated terminations for electronic components, including a step of immersing a plurality of electronic components in an electroless bath solution for a predetermined amount of time such that a termination material is deposited on the plurality of electronic components to form respective bridged terminations among selected of the exposed internal electrode elements. Both Maher et al. and McLoughlin references fail to disclose all such elements of claim 1.

Maher et al. discloses a capacitor end termination composition and related method of terminating such components. The multi-layered terminations formed in Maher et al. respectively include an initial base layer comprising a metallo organic resinate material. Such a base metal resinate acts as an adhesion promoter for facilitating the formation of a film on the surface on which the composition is applied (col. 2, lines 15-18). The silver based resinate is applied to a ceramic body at its ends by hand dipping or mechanically dipping the capacitor ends into the resinate composition (col. 3, lines 58-65). Only after formation of this initial layer may leach resistance boundary layers (e.g., nickel layers formed by electroplating or electrolytic plating) be formed thereon. Numbered page 2 of the August 16, 2004 Office Action equates the above terminations and related process steps as disclosed in Maher et al. to the termination formation process set forth in original claim 1. There are many differences between the two technologies.

Claim 1 sets forth that the subject terminations (which are formed by depositing termination material directly on the electronic components) are formed by immersing a plurality of electronic components in an electroless bath solution. In contrast, the initial resinate termination layer of Maher et al. is formed by carefully dipping only the end portions of the capacitor chips in the resinate composition. If such termination material were applied according to the process of claim 1, the resinate composition would cover the entire ceramic body, shorting together all of the capacitor electrodes and destroying the functionality of the capacitors. Furthermore, such hand dipping or mechanical dipping process must be done on an individual component-by-component basis, not a bulk process as set forth in claim 1 whereby a plurality of electronic components are simultaneously terminated. The process set forth in claim 1 is much more time efficient and cost effective than that disclosed in Maher et al.

Thus, the initial resinate composition layer of the Maher et al. terminations cannot be the same as the termination layer referred to in original claim 1. Further, the leach resistant boundary layer 16 disclosed in Maher et al. also cannot be compared to the termination layer referred to in claim 1. The boundary layer 16 disclosed in Maher et al. is not formed directly on the electronic components, but instead over the initial resinate

termination layer, which is required for adhesion promotion of boundary layer 16. A fundamental aspect of the process set forth in claim 1 is that the subject plated terminations are formed directly on the electronic components as opposed to on top of some initial termination layer. The elimination of conventional initial termination layers (e.g., printed silver layers) as required in many prior art processes for effective adherence to the body of a terminated component and for providing a base to which additional termination layers may be plated offers a significant advantage. The elimination of such a base termination layer is enabled in part by the provision of exposed internal electrode elements or other conductive elements at specifically selected locations along the periphery of multilayer electronic components. By providing such exposed conductive portions in specifically defined and proximal locations, the formation of plated terminations directly on an electronic component (as opposed to on an initial adhesion termination layer) may be formed in a self-guided process.

Since all aspects set forth in original claim 1 are not disclosed in Maher et al., such reference cannot by law anticipate claim 1. Since claims 3-5 and 8-11 further limit claim 1, Maher et al. cannot by law anticipate claims 3-5 and 8-11, and acknowledgement of the same is earnestly solicited. Applicants note that the August 16, 2004 Office Action fails to point out where the features of claims 9-11 are disclosed in Maher et al., and thus such reference cannot anticipate such claims.

McLoughlin discloses a method for providing a nickel barrier end termination in which a zinc oxide semiconductor device is controllablly reacted with nickel plating solution only on an exposed end terminal region. Controllable contact of the component body and the nickel plating solution is required to assure that the nickel barrier end terminations 30 uniformly cover terminal region 32 without extending undesirably along exposed surface 38 (see col. 3, lines 47-52). The technology disclosed in McLoughlin is quite different from the termination technology set forth in original claim 1.

Claim 1 sets forth that a plurality of electronic components are immersed in an electroless bath solution to form respective bridged terminations among selected of the exposed internal electrode elements. Thus, the plating process set forth in claim 1

results in plating determined by the location of the exposed electrode elements. In accordance with claim 1, the components can be entirely immersed as opposed to selectively dipped as disclosed in McLoughlin. The precision-controlled contact required in the methods of McLoughlin is a complicated and impractical procedure.

If the methodology set forth in McLoughlin were modified from controllable contact of a semiconductor device with the disclosed plating solution to complete immersion of such semiconductor devices, the plating would adhere to the entire surface of the device. This would destroy the device functionality without the incorporation of additional process steps to then remove certain portions of the plated material. This is described as a prior art disadvantage in col. 1, lines 36-50 of McLoughlin and as a phenomena that is avoided in accordance with the simplified manufacturing process of McLoughlin. Thus, McLoughlin teaches away from complete immersion of electronic components in a plating solution to form selectively deposited termination material. Applicants note that in accordance with §2141.03 of the MPEP, prior art must be considered in its entirety, including disclosures that teach away from the claims.

Since all steps set forth in original claim 1 are not disclosed in McLoughlin, specifically the steps of providing a plurality of electronic components and immersing the entire plurality of such electronic components in a bath solution, such reference cannot by law anticipate claim 1. Since claims 3-5 and 8-11 further limit claim 1, McLoughlin cannot by law anticipate claims 3-5 and 8-11, and acknowledgement of the same is earnestly solicited. Furthermore, McLoughlin teaches away from the process set forth in claim 1 and its dependent claims and as such should not be cited against such claims.

REJECTION OF ORIGINAL CLAIMS 1-20 (35 U.S.C. §103(A)):

Original claims 1-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,310,757 (Tuzuki et al.) in view of U.S. Patent No. 3,992,761 (McElroy et al.). Based on the following remarks, Applicants respectfully traverse such rejection and respectfully request reconsideration thereof.

Original claims 1 and 12 set forth respective methods of forming electrolessly plated terminations for electronic components, and both include a step of immersing a plurality of electronic components in an electroless bath solution for a predetermined amount of time such that a termination material is deposited on the plurality of electronic components to form respective bridged terminations among selected of the exposed internal electrode elements. Both Tuzuki et al. and McElroy et al. references fail to disclose all such elements of claims 1 and 12.

Tuzuki et al. discloses an electronic component with external electrodes and related process steps for forming such a component. The multi-layered external terminations formed in Tuzuki et al. include a first conductive layer 16 that is formed by preparing a conductive paste, dipping one end portion of each capacitor element into the paste layer and drying the paste, then dipping another portion of the capacitor element in the paste layer and drying the paste. After applying the initial conductive layer 16, an optional palladium layer 18 may be formed as well as layers of electrolytically plated nickel 20b and solder 20a. Numbered pages 3 and 4 of the August 16, 2004 Office Action equate the above terminations and related process steps as disclosed in Tuzuki et al. to the termination formation process set forth in original claims 1 and 12. There are many differences between the two technologies.

Claim 1 and 12 respectively set forth that the subject terminations (which are formed by depositing termination material directly on the electronic components) are formed by immersing a plurality of electronic components in an electroless bath solution. In contrast, the initial conductive layer of the Tuzuki et al. terminations is formed by carefully dipping only the end portions of the capacitor chips in conductive paste. If such termination material were applied according to the process of claim 1, the conductive paste would cover the entire ceramic body, shorting together all of the capacitor electrodes and destroying the functionality of the capacitors. Furthermore, the precision component dipping must be done twice per component on an individual component-by-component basis, not in a bulk process as set forth in claim 1 whereby a plurality of electronic components are simultaneously terminated. The process set forth

in claim 1 is much more time efficient and cost effective than that disclosed in Tuzuki et al.

Thus, the application of the initial conductive layers 16 of Tuzuki et al. cannot be the same as the termination layer referred to in original claim 1. Furthermore, the electrolytic nickel and/or solder layers disclosed in Tuzuki et al. cannot be compared to the termination layer referred to in claim 1. The electrolytic Ni layer 20b disclosed in Tuzuki et al. is not formed directly on the electronic components, but instead over the initial conductive layer or subsequently applied Palladium layer. A fundamental aspect of the process set forth in claim 1 is that the subject plated terminations are formed directly on the electronic components (a combination of ceramic substrate layers and exposed electrode portions) as opposed to on an initially-applied totally conductive surface. The elimination of conventional initial termination layers (e.g., thick-film paste layers) as required in many prior art processes for effective adherence to the body of a terminated component and for providing a base to which additional termination layers may be plated offers a significant advantage. The elimination of such a base termination layer is enabled in part by the provision of exposed internal electrode elements or other conductive elements at specifically selected locations along the periphery of multilayer electronic components. By providing such exposed conductive portions in specifically defined and proximal locations, the formation of plated terminations directly on an electronic component that bridge between exposed internal electrode elements may be formed in a self-guided process. Plated terminations that bridge between specifically oriented exposed conductive portions is not required or even desired in the plating processes of Tuzuki et al.

The August 16, 2004 Office Action attempts to cure the deficiencies of Tuzuki et al. by citing McElroy et al. However, McElroy et al. is also fundamentally different from the termination methodology set forth in respective claims 1 and 12. McElroy et al. discloses a step of forming electrically conductive termination films 18 on portions of an array of multi-layer capacitors. The termination films may correspond to an electrically conductive metal such as nickel or copper and may be formed in accordance with electroless plating techniques, but the way in which the resultant location of the

termination films are defined and formed is quite different than in accordance with the methods of original claims 1 and 12.

Before the termination films 18 of McElroy et al. can be formed, a plurality of capacitors must be inserted through holes in a thin support sheet then encapsulated in a block of plastic material. The block is then immersed in a suitable solvent to dissolve or soften a given portion of the block such that exposed portions 19a of the outer surfaces 19 of each of the capacitor bodies 12 is exposed (see Fig. 8 and col. 3, line 61 – col. 4, line 34.) The exposed ends must then be immersed in an etchant to treat the exposed surfaces for improved adherence of subsequently applied termination films. The entire block must also be immersed in a sensitizing material before being subjected to the plating material such that metal will only plate on the sensitized exposed surfaces of the capacitor bodies.

Claims 1 and 12 set forth that the plurality of electronic components are immersed in an electroless bath solution and termination material bridges the exposed internal electrode elements to form terminations directly on the electronic components. No additional steps such as providing an encapsulating block, sensitizing select exposed portions of the components, etc. is required as in the process disclosed in McElroy et al. In contrast, the location of the termination material corresponds only to the location of the exposed internal electrodes. By providing exposed conductive portions in specifically defined and proximal locations, the formation of plated terminations directly on an electronic component that bridge between exposed internal electrode elements may be formed in a self-guided process. Plated terminations that bridge between specifically oriented exposed conductive portions is not required or even desired in the plating processes of McElroy et al.

Since all aspects set forth in original claims 1 and 12 are not disclosed singularly or in combination of the Tuzuki et al. and McElroy et al. references, claims 1 and 12 should be allowed over such references. Also, since claims 2-11 and 13-20 variously depend from otherwise allowable respective independent claims 1 and 12 and further limit same, claims 2-11 and 13-20 should also be allowed. Acknowledgement of the same is earnestly solicited.

REJECTION OF ORIGINAL CLAIMS 2, 6, 7 and 12-20 (35 U.S.C. §103(A)):

Original claims 2, 6, 7 and 12-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Maher et al. or McLoughlin in combination with Tuzuki et al. Based on the following remarks, Applicants respectfully traverse such rejection and respectfully request reconsideration of the rejected claims.

The previous remarks in the section of this paper regarding the rejection of original claims 3-5 and 8-11 describe several fundamental differences between the steps set forth in original claim 1 and the technologies disclosed in both Maher et al. and McLoughlin. The same differences also equally apply to the technology set forth in independent claim 12, and Applicants refer to the same arguments for the 35 U.S.C. §103(a) rejection of claims 2, 6, 7 and 12-20. Also, the remarks in the immediately preceding section re the rejection of claims 1-20 distinguish the subject matter of claims 1-20 from the disclosure of Tuzuki et al. and Applicants refer to those arguments as well for the subject rejection.

In general, claims 1 and 12 set forth steps for terminating a plurality of components in a bulk process. A plurality of electronic components are provided with ceramic substrate layers and internal electrode elements selectively interleaved such that the internal electrode elements are exposed at predetermined locations along the periphery of the components. Immersion of such plurality of electronic components in an electroless plating solution enables the formation of bridged terminations based on the location of the exposed internal electrode elements. This self-guided formation of component terminations eliminates many complicated steps that are involved with prior art and other termination processes. There is no precision dipping of components in a termination paste or plating solution, no masking of components is required and the components do not need to be held in a certain way for the termination process of claim 1 to effectively occur. The termination material goes where the electrodes are exposed, thus yielding a unique self-determining termination process.

In contrast with the above features as set forth in claims 1 and 12, the technology disclosed in Maher et al. and in Tuzuki et al. both are directed to forming plated layers on top of a totally conductive surface where no bridging terminations among exposed

conductive elements are required or even suggested. If modifications to such references were proposed to eliminate the initial conductive termination layer or to apply the subsequent termination layers directly to surfaces other than the totally conductive initial termination layers, the principles of operation of such disclosed processes would be changed. In accordance with §2143.01 of the MPEP, proposed modifications cannot change the principle of operation of a reference.

The techniques disclosed in such references and also that disclosed in McLoughlin correspond to respective processes for forming external electrodes in often complicated and expensive procedures that require high levels of precision and individual component placement as opposed to the batch processing set forth in claims 1 and 12 were a plurality of components are immersed in a plating solution. Furthermore, McLoughlin teaches away from complete immersion of electronic components in a plating solution (see col. 1, lines 36-50). As such, McLoughlin should not be cited against the subject claims.

Based on the aforementioned remarks, Applicant submit that claims 1 and 12 are patentable over the Maher et al., McLoughlin and Tuzuki et al. references, and acknowledgement of the same is earnestly solicited. Further, since claims 2, 6 and 7 and 13-20 variously depend from otherwise allowable respective claims 1 and 12 and further limit same, Applicants further submit that claims 2, 6, 7 and 13-20 should also be allowed over such references.

CONCLUSION:

Inasmuch as all outstanding issues have been addressed, it is respectfully submitted that the present application, including claims 1-20, is in complete condition for issuance of a formal Notice of Allowance, and action to such effect is earnestly solicited. The Examiner is invited to telephone the undersigned at his convenience should only minor issues remain after consideration of this response in order to permit early resolution of the same or if he has any questions regarding this matter.

Respectfully submitted,

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